

19990505.ba v02\_n533.bam.990505

>From ???@??? Wed May 05 18:09:08 1999  
Message-Id: <199905051121.GAA28330@sco.theporch.com>  
Date: Wed, 5 May 1999 06:21:08 CDT  
From: Old Tube Radios <boatanchors@theporch.com>  
To: Old Tube Radios <boatanchors@theporch.com>  
Subject: BOATANCHORS digest 2533

BOATANCHORS Digest 2533

Topics covered in this issue include:

- 1) Project Mercury Radios  
by Don <71333.144@compuserve.com>
- 2) Mystery Transmitter: RCA AVT-23  
by David Stinson <arc5@ix.netcom.com>
- 3) Filters  
by Morris Odell <morriso@vifp.monash.edu.au>
- 4) Re: Relays  
by Bob Roehrig <broehrig@admin.aurora.edu>
- 5) Re: cabinet restoration question....  
by Brian.Harris@sv.sc.philips.com (Brian Harris)
- 6) Speaking of relays.  
by N5CM@aol.com
- 7) Re: Audiophoolery Explained  
by Morris Odell <morriso@vifp.monash.edu.au>
- 8) Re: Project Mercury Radios  
by "Jay H. Miller" <jmiller@teleteam.net>
- 9) BA Haunts, E. PA and Maryland?  
by "L. Kayser" <kayser@king.igs.net>
- 10) Re: Audiophoolery Explained (long)  
by "Barry L. Ornitz" <ornitz@tricon.net>
- 11) Re: Relays  
by Jerry Proc <jproc@idirect.com>
- 12) SPARC Radio Museum  
by Jerry Proc <jproc@idirect.com>
- 13) Viking filter takedown  
by mnhopkins@juno.com
- 14) Tektronix part wanted  
by Morris Odell <morriso@vifp.monash.edu.au>
- 15) Insulator Ceramic  
by David Stinson <arc5@ix.netcom.com>
- 16) Re: Tektronix part wanted  
by "Arden Allen" <gumbear@pacbell.net>
- 17) WTB: Manual for Tektronix 1A2 plug-in  
by "Arden Allen" <gumbear@pacbell.net>
- 18) RE: Ranger POT needed

by "David Newkirk" <dpnewkirk@home.com>  
19) Re: Insulator Ceramic  
by Jim Garland W8ZR <4CX250B@miavx1.acs.muohio.edu>

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Date: Tue, 4 May 1999 16:33:24 -0400  
From: Don <71333.144@compuserve.com>  
Subject: Project Mercury Radios  
To: Old Tube Radios <boatanchors@theporch.com>  
Cc: boatanchors <boatanchors@theporch.com>  
Message-ID: <199905041636\_MC2-7463-749F@compuserve.com>  
MIME-Version: 1.0  
Content-Transfer-Encoding: 7bit  
Content-Type: text/plain; charset=us-ascii  
Content-Disposition: inline

Dave Stinson was looking for information about radios used in Project Mercury. The only thing I know was that Collins was the subcontractor to McDonnell Douglas for the capsule radio gear. Beyond that, I have seen no details. This info and an absolutely great read on the history of Project Mercury is in NASA Special Publication 4201 of the NASA History Series, published in 1989, entitled "This New Ocean: A History of Project Mercury" by Lloyd Swenson, James Grimwood and Charles Alexander. The entire text of this document is available on the Web somewhere but I do not have the URL.

The text makes reference to capsule designers fighting to make the liftoff weight and Collins choosing between "miniature" and "subminiature" components. Reading between the lines, I suspect that tubes did fly in Mercury--but no octal base types.

73, Don

-----  
Message-ID: <372F601E.154BA6FC@ix.netcom.com>  
Date: Tue, 04 May 1999 16:01:18 -0500  
From: David Stinson <arc5@ix.netcom.com>  
MIME-Version: 1.0  
To: Old Tube Radios <boatanchors@theporch.com>  
Subject: Mystery Transmitter: RCA AVT-23  
Content-Type: text/plain; charset=us-ascii  
Content-Transfer-Encoding: 7bit

Just received a real jewel from a kind gentleman.

Wondering if any of you know anything about the RCA AVT-23 Aircraft transmitter. Appears to be Navy from WW-II or just prior. Details and photographs at

<http://www.arc5.com/rca/avt23.htm>

Anyone have connector details, pin-outs, manual, history, anything?

TNX ES 73 DE Dave Stinson AB5S  
arc5@ix.netcom.com

-----  
Message-ID: <372F78D8.99212F93@vifp.monash.edu.au>  
Date: Wed, 05 May 1999 08:46:48 +1000  
From: Morris Odell <morriso@vifp.monash.edu.au>  
MIME-Version: 1.0  
To: Old Tube Radios <boatanchors@theporch.com>  
Subject: Filters  
Content-Type: text/plain; charset=us-ascii  
Content-Transfer-Encoding: 7bit

Hi all,

My latest shack warmer is a Tek 549 which has a large fan and air filter on the back. Unfortunately the filter was one of those self-destructing plastic ones and sure enough, all that was left of it was a pile of mesh fragments that had to be sucked out with a vacuum cleaner.

I've had a couple of Tek 'scopes with this problem and since I plan to use the 549 as the bench workhorse I had to find a replacement.

At the local hardware store I found some non-woven synthetic matting that is sold as air-conditioning filter material. I sandwiched a piece of this between retainers made of fine (1 cm) mesh galvanized netting and voila!

It looks great and seems not to impede air flow too much. There's still lots of warm air percolating out of the sides of the cabinet. I suppose a purist would conduct temperature rise measurements but I'm not equipped for it.

I think this is a neat solution to a perennial problem which Tek aficionados must encounter quite often and must also occur in other pieces of vacuum tube gear.

73 de Morris VK3DOC

-----  
Date: Tue, 4 May 1999 17:52:55 -0500 (CDT)  
From: Bob Roehrig <broehrig@admin.aurora.edu>  
To: Old Tube Radios <boatanchors@theporch.com>  
cc: Old Tube Radios <boatanchors@theporch.com>

Subject: Re: Relays

Message-ID: <Pine.ULT.3.96.990504175101.9662B-100000@admin.aurora.edu>

MIME-Version: 1.0

Content-Type: TEXT/PLAIN; charset=US-ASCII

On Tue, 4 May 1999, Richard Loken wrote:

> That is not all, some relay coils were intended to be in series with something  
> else rather than across the power supply so they tended to have low coil  
> resistance so as to minimize their influence on the rest of the circuit.  
> The phone company liked to do this for things like detecting an off hook  
> condition or a thousand other things we could never imagine.

Yeah - relays. I used to work for W.E. and there is nothing more beautiful  
than a good old wire-spring relay.

"Nostalgia is a thing of the past"

E-mail: broehrig@admin.aurora.edu or k9eui@arrl.net 73 de Bob, K9EUI

CIS: Data / Telecom Aurora University, Aurora, IL

630-844-4898 Fax 630-844-4222

-----  
Mime-Version: 1.0

Date: Tue, 4 May 1999 17:55:48 -0700

Message-ID: <00322259.1914@svlima.sv.sc.philips.com>

From: Brian.Harris@sv.sc.philips.com (Brian Harris)

Subject: Re: cabinet restoration question....

To: Old Tube Radios <boatanchors@theporch.com>

Content-Type: text/plain; charset=US-ASCII

Content-Transfer-Encoding: 7bit

Content-Description: cc:Mail note part

Mark,

Glass bead or walnut shell blasting is much easier on the metal and, therefore,  
is preferred over sand blasting. Most automotive restoration shops have bead  
blasting cabinets and many furniture refinishers have walnut shell capability.  
If you have significant rust, bead blasting works better than walnut shells. The  
finish with either will be smoother and worthy of a fine receiver. If you lived  
near Dallas I could do it for you.

Brian

----- Reply Separator -----

Subject: cabinet restoration question....

Author: Nc183d@aol.com at !SMTP/INTERNET

Date: 5/4/99 6:07 PM

Hi All,

Sorry if I am not within the guidelines of the reflector list, but here goes. I would like to know where I would go to get some metal cabinets sandblasted in order to restore the original finish to them. The pile is getting bigger all the time and I have no idea where to even start to look for a sandblasting service that would work on small items like these. Please reply directly to me at: nc183d@aol.com as I don't want to clog up the reflector and aggravate Gene....

Kindest regards,  
Mark S.

-----  
From: N5CM@aol.com  
Message-ID: <3e69d885.2460db3a@aol.com>  
Date: Tue, 4 May 1999 19:22:34 EDT  
Subject: Speaking of relays.  
To: Old Tube Radios <boatanchors@theporch.com>  
MIME-Version: 1.0  
Content-Type: text/plain; charset="us-ascii"  
Content-Transfer-Encoding: 7bit

Hi Gang,

Does anyone have or know where I might find a supply of house wiring low voltage control relays?

I need a quantity for a project in progress.

Thanks, Ken....N5CM....

-----  
Message-ID: <372F93D9.53185DDA@vifp.monash.edu.au>  
Date: Wed, 05 May 1999 10:42:01 +1000  
From: Morris Odell <morriso@vifp.monash.edu.au>  
MIME-Version: 1.0  
To: Old Tube Radios <boatanchors@theporch.com>  
Subject: Re: Audiophoolery Explained  
Content-Type: text/plain; charset=us-ascii  
Content-Transfer-Encoding: 7bit

This is a very interesting subject and one which has had me reaching for the Nomex underwear on more than one occasion.

There has been a lot of technical discussion regarding distortion of

various kinds and names, and the contribution of feedback to it. Those technical issues are all very well but I think there is a strong psychological issue here to do with the forces giving rise to the irrationality of audiophoolery.

Arden Allen got close to it when wrote:

> If someone was nuts enough to try it (there are plenty available), a  
> preferred toob design's performance could be mapped to a DSP and faithfully  
> (by any objective criterea you want to try) reproduced but it wouldn't sell  
> even with its life-time reliability and low cost. "Toob sound" occurs in  
> the imagination heavily biased by cult propaganda and self conceived  
> ideologies in want of an outlet for social recognition.

I don't think performance has much to do with it at all, it's the  
\*\*\*appearance\*\*\* of performance that counts.

It's a similar mechanism to that which motivates us with our boatanchors, just misdirected. We like to look at the pretty glowing tubes and strangely shaped pieces of metal - those wierd things that conjure up the magic of the utimate function of the device. We like it because you can see it - not like those mysterious little black insects that came later and perform their function in an arrogant soulless way whout giving anything in the way of a visible relationship between structure and function.

We also like it because it has the charm of the old. It's human nature to value things that have lost their legitimate use. Look at the contents of any "collectible" sale and you will see lots of items that were once commonplace but as soon as they became obsolete they acquired a different sort of value.

The audiophooles are no different. Not only wouldn't they like a DSP version of "tube sound" as Arden suggested, they wouldn't like a totally enclosed tube amplifier either. They like to look at the magic as much as we do but they don't have the honesty to admit it. You only have to look at some of their toys to see the reality of this. That's why you can buy a CD player with a room's worth of vacuum tubes condensed into a couple of chips and the output fed through two tube buffers behind a dinky little window. There's even a button marked "preheat" to give the owner the illusion of participation in the technology. There's a web page somewhere with some lovely pictures of astronomically expensive tube amplifiers that really do look like pieces of modern sculpture.

Hence the huge self-deluding edifice that has arisen around subjectivism, tube sound, various flavours of distortion etc etc. They feel that they have to justify their enjoyment of tube technology by

finding a technological legitimacy for it. That's why there's no point arguing with them on technical grounds. It's an ideological and psychological issue which has assumed a self-perpetuating life of its own, fed, as Arden remarks by financial greed.

As for me, I just hope they don't start collecting Tektronix oscilloscopes to look at the music with. There used to be an ad in electronics journals years ago which showed an effete looking embryonic audiophooler (complete with goatee and monocle) saying "I used to watch the music on the oscilloscope until I heard XXXXX speakers...".

I'd better stop now before Jack punishes me by making me read rec.audio.tubes for a month :-)

Morris

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Message-Id: <103130300b35548514f30@[199.34.24.14]>  
Mime-Version: 1.0  
Content-Type: text/plain; charset="us-ascii"  
Date: Tue, 4 May 1999 20:00:34 -0500  
To: Old Tube Radios <boatanchors@theporch.com>  
From: "Jay H. Miller" <jmiller@teleteam.net>  
Subject: Re: Project Mercury Radios

There is a photograph of Art Collins holding the Mercury radio control box on my website:

<http://www.teleteam.com/~jmiller/historic.html>

The little box actually had a large pushbutton for the astronaut to send CW if he needed to!

73

\*\*\*\*\*  
Jay H. Miller, KK5IM                      Dallas, Texas  
The Pocket Guide to Collins Amateur Radio Equipment  
Coming this Summer: A Pictorial History of Collins Amateur Radios  
ARRL \* AMI#846 \* DXCC  
E-Mail: jmiller@teleteam.net   Home Page: <http://www.teleteam.com/~jmiller/>  
\*\*\*\*\* Proud to be 100% Macintosh since 1984! \*\*\*\*\*

-----  
Message-ID: <01BE9671.D34507E0.kayser@king.igs.net>  
From: "L. Kayser" <kayser@king.igs.net>  
To: Old Tube Radios <boatanchors@theporch.com>  
Subject: BA Haunts, E. PA and Maryland?

Date: Tue, 4 May 1999 21:05:19 -0400

Greetings:

I will be travelling from Watertown NY, via Albany thence to Baltimore and Washington with return through eastern PA. Any information on BA haunts I should check into would be appreciated.

Reply ASAP please, leaving here Thursday morning...

73, Larry VA3LK

-----  
Message-Id: <199905050105.VAA06328@flash.naxs.net>  
From: "Barry L. Ornitz" <ornitz@tricon.net>  
To: Old Tube Radios <boatanchors@theporch.com>  
Subject: Re: Audiophoolery Explained (long)  
Date: Tue, 4 May 1999 22:03:42 -0400

While vacuum tube circuitry is fair game in this list, Hi-Fi audio is generally frowned on for discussion (unless it relates to modulators). So I will try to keep the comments short.

Robert Okas wrote:

> Gotta throw in my 0.02 to bring up some facts. First, when you  
>scan scholarly literature, you will discover that Dr. Matti Ojala  
>is one of the first, if not \*the\* first to investigate the effects  
>of T.I.M. extensively. It wasn't necessarily 'invented' so much as  
>researched as a source of hyellowy audio. One has to assume that  
>since these were scholarly works, his purpose was to explain why  
>solid state amps sounded so lousy.

The math behind this was worked out in the 1920's and 1930's. It was used extensively in the automatic process control industry starting in the 1940's and was far from scholarly. In fact, closed-loop transfer function analysis is generally taught in the beginner's first course in control theory. Both Bode and Black published entire volumes with very practical applications as they worked for Bell Telephone. Much of these books are devoted to equalizers and such to extend the bandwidth for telephone lines. This does not sound very scholarly to me.

> I need to review some facts here. In a typical medium power  
>tube amp, say the Dynaco ST-70, you have a voltage amp of some  
>sort, in this case, the pentode half of a 7199. Next up is the  
>phase inverter of the split-load type using the triode half of the  
>7199. Next up is the push-pull stage followed by the output tranny.



>Take the feedback from the tap where the speakers are connected,  
>run through an RC network and on to the cathode of the first 7199  
>stage. That's 3 stages encompassed by the loop. In an RCA tube  
>manual I have, there's a design that incorporates a driver stage to  
>the basic topology just described. So now we're up to 4. Feedback  
>loops around 3 or more stages in tube amps are quite common.

Most simple feedback loops in vacuum tube gear work with two or less stages. Certainly there are exceptions. Note the RC networks added to feedback path. This has to do with loop stability. With the wrong amplitude and phase, the circuit becomes one big oscillator. The more stages around which feedback is applied, the more critical it is to "tune" the feedback network. I would bet the RC network you describe is a phase-lead network. With only two stages in the feedback loop, much simpler feedback can be used.

As Bobbi Barmore pointed out, some AM stations had linear detectors to look at the output signal and provide feedback to try to linearize the entire modulation process. The "muddy" sound she described is an indication that the cancellation of distortion was not perfect and that the resulting bandwidth was less than perfect.

It can be easily demonstrated mathematically and with measurements that the stability of a feedback loop is more difficult as the number of stages is increased. As the cumulative phase lag of the stages approaches and exceeds 180 degrees, it is difficult to stabilize the system.

> Overall negative feedback in hollow state amps was used primarily  
>to get the speaker circuit involved (and therefore decrease the  
>output resistance) so that its contribution to distortion, as  
>well as the output tranny's can be compensated.

Agreed. It also reduces some of the nonlinearity of the vacuum tubes themselves.

> On the other hand, solid state designers embraced the op-amp  
>model for 2nd and 3rd generation power amp designs. That, IMO, is  
>where the trouble started. Without feedback, the open-loop gains of  
>these designs could be in excess of 500,000. This was way too much,  
>but was easily knocked back with a simple feedback network.

Not really. The concept is to use the exceptionally large gain-bandwidth product to advantage. If you cut the gain with feedback, you increase the frequency response. For example, most low-end semiconductor op-amps have a pole around 10 Hz with a response falling off at 20 dB/decade. So with 100 or more decibels of potential amplification, you can easily afford to trade

gain off for increased bandwidth up to several hundred kilohertz. Gain bandwidth product is something seldom seen in vacuum tube terminology. Hank Van Cleef has discussed this in the past with respect to wide bandwidth amplification for Tek's oscilloscopes.

>A major bonus was lower steady-state harmonic and intermod  
>distortion. Most folks on this list are old enough to remember the  
>distortion wars fought by the (mostly) off-shore hifi purveyors,  
>who claimed an average joe or jane could tell the difference between  
>.01% and .001%. If anything, the industry knew all too well about  
>how to apply feedback to hit the steady-state distortion bogie set  
>by the marketing depts. The problem is that these amps are not used  
>to amplify steady-state stuff. Amplifying dynamic signals causes  
>these to sound horrible. That's where T.I.M. comes into play,  
>induced by the excessive overall feedback and the transit times in  
>sand state devices. The loop 'breaks' during those transients and  
>the whole thing goes into saturation.

This is pretty much what I said - except, transit time in solid-state devices is an extremely minor contributor. Ignoring it is much like ignoring the transit time in tubes, perfectly acceptable until you get to VHF and above. However, as Arden Allen pointed out in private mail, the input capacitance of a bipolar semiconductor device is high and early designers often relied on the vacuum tube experience and ignored this with disastrous results.

> We must remember that tube circuits use inherently higher  
>impedances than sand state. No real need for 'lytics except as  
>bypasses since high capacitance isn't required in the signal path.  
>I remember Jung's papers. Capacitor distortion is a quantity that  
>can be easily measured, it's not pseudo-science hokum.

I never said that capacitor distortion was pseudoscience. I just said it had been studied long before Jung ever decided to "reinvent" it. As one who has done considerable measurement of the dielectric properties of many plastics and polymers, I certainly know that capacitor nonlinearity effects are real. And they all had been discussed and analyzed in many scientific journals, and practical ones too, long before Jung. Debeye and Froehlich published extensive studies of such dielectrics in the early 1950's and Von Hippel's book on experimental measurements of polymer dielectrics came out just after WWII. Audiophiles still argue about the "coloration" of a Mylar capacitor, yet Reddich (\*) has published the full curves for the complex permittivity of polyethylene terephthalate as a function of temperature and frequency. Of course, Reddich was a physical chemist, and the audio crowd never seems to look outside their own little area.

Let's get back to radios... where religion is not involved (with the possible exception of the Collins Collectors!) :-)

73, Barry WA4VZQ ornitz@tricon.net

(\*) The name is from my memory and the spelling may be incorrect. Actually instead of curves, he presented his results in the form of three dimensional surfaces. I was able to generate similar results with several other Eastman polyesters (a few of which are better than Mylar/PET).

-----  
Message-ID: <372FB617.117930F8@idirect.com>  
Date: Tue, 04 May 1999 23:08:08 -0400  
From: Jerry Proc <jproc@idirect.com>  
MIME-Version: 1.0  
To: Old Tube Radios <boatanchors@theporch.com>  
Subject: Re: Relays  
Content-Type: text/plain; charset=us-ascii  
Content-Transfer-Encoding: 7bit

Thanks to all those who responded to my relay question.

--

Regards,  
Jerry Proc VE3FAB jproc@idirect.com  
Web: [www3.sympatico.ca/hrc/haida](http://www3.sympatico.ca/hrc/haida)  
HMCS HAIDA Historic Naval Ship, Toronto Ontario

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Message-ID: <372FB800.AD5C4008@idirect.com>  
Date: Tue, 04 May 1999 23:16:17 -0400  
From: Jerry Proc <jproc@idirect.com>  
MIME-Version: 1.0  
To: Old Tube Radios <boatanchors@theporch.com>  
Subject: SPARC Radio Museum  
Content-Type: text/plain; charset=us-ascii  
Content-Transfer-Encoding: 7bit

Hi Folks,

The SPARC Radio Museum in British Columbia now has a Web site. The address is:

<http://www3.bc.sympatico.ca/radiomuseum/>

--

Regards,  
Jerry Proc VE3FAB jproc@idirect.com  
Web: www3.sympatico.ca/hrc/haida  
HMCS HAIDA Historic Naval Ship, Toronto Ontario

-----  
To: Old Tube Radios <boatanchors@theporch.com>  
Date: Tue, 4 May 1999 22:17:36 -0500  
Subject: Viking filter takedown  
Message-ID: <19990504.221751.-489547.0.MNHopkins@juno.com>  
MIME-Version: 1.0  
Content-Type: text/plain  
Content-Transfer-Encoding: 7bit  
From: mnhopkins@juno.com

Wa5VJB gave me a Nye Viking high pass filter that suffered a lightening hit. It smoked a 239 but inside everything looked OK. Here is what you find when you drill out the rivets:

The filter says only Nye Viking High Pass, no numbers, and measures 11 inches overall and 2 5/16 inches across its circular aluminium case. Two long bolts hold eight spacers that hold three partitions to form four separate sections inside.

Each section has a 6 turn, 5/8 OD coil of aluminium wire a little bigger than 1/16 inch diameter and the pitch is 8 TPI. Two five turn coils at the ends go from the connector frames to coaxial caps and each of the partitions is in fact a capacitor formed by a 1 5/8 diameter disc on each side of the partition. The coils attach to the centers of the discs.

Pop rivets are used to hold eyelets which are the anchors for the ends of the coils.

Compared to a MARS, this is an assembly line looking filter, and it is not adjustable, but since a lightening hit did not fry it, I won't complain.

de ab5L, Michael Hopkins, Box 226841, Dallas, TX 75222,  
MNHopkins@JUNO.com  
Student of Tecraft, ICM, and Six Meters' golden age, 1956-58.

-----  
Message-ID: <372FC81C.1F9320E0@vifp.monash.edu.au>  
Date: Wed, 05 May 1999 14:25:00 +1000  
From: Morris Odell <morriso@vifp.monash.edu.au>  
MIME-Version: 1.0  
To: Old Tube Radios <boatanchors@theporch.com>

Subject: Tektronix part wanted  
Content-Type: text/plain; charset=us-ascii  
Content-Transfer-Encoding: 7bit

Hi all,

I've discovered that the HV transformer in my "new" Tek 549 is lossy leading to HV regulation failure. This was apparently a common problem with them. As the transformer heats up it gets lossier leading to problems after about 20 minutes. The cure is a replacement or rewind transformer.

Does anyone have a junked 549 with a HV transformer available?

As usual, all reasonable costs covered...

73

Morris

-----  
Message-ID: <372FCFF5.8F02512D@ix.netcom.com>  
Date: Tue, 04 May 1999 23:58:30 -0500  
From: David Stinson <arc5@ix.netcom.com>  
MIME-Version: 1.0  
To: Old Tube Radios <boatanchors@theporch.com>  
Subject: Insulator Ceramic  
Content-Type: text/plain; charset=us-ascii  
Content-Transfer-Encoding: 7bit

Those white insulators we use in our boatanchors-  
Are they basically the same material as that we hear about being  
used in superconducting experiments today?  
What is it about the molecular structure of ceramic  
that makes it so hard yet so brittle (Barry?)?

Thanks,  
Dave AB5S

-----  
Message-Id: <199905050540.WAA00052@mta2.snfc21.pbi.net>  
From: "Arden Allen" <gumbear@pacbell.net>  
To: Old Tube Radios <boatanchors@theporch.com>  
Subject: Re: Tektronix part wanted  
Date: Tue, 4 May 1999 22:33:22 -0700  
MIME-Version: 1.0  
Content-Type: text/plain; charset=ISO-8859-1  
Content-Transfer-Encoding: 7bit

Hi Morris;

> I've discovered that the HV transformer in my "new" Tek 549 is lossy  
> leading to HV regulation failure. This was apparently a common problem  
> with them. As the transformer heats up it gets lossier leading to  
> problems after about 20 minutes. The cure is a replacement or rewind  
> transformer.

You may be able to get an original replacement from Deane Kidd or get it  
rewound by Bill Schell. Don't have their contact info handy but others do  
on the list. I would avoid a tranny from a cannibalized unit because it  
probably is gone or near gone too.

Arden Allen KB6NAX Vallejo, CA gumbear@pacbell.net

-----  
Message-Id: <199905050540.WAA00094@mta2.snfc21.pbi.net>  
From: "Arden Allen" <gumbear@pacbell.net>  
To: Old Tube Radios <boatanchors@theporch.com>  
Subject: WTB: Manual for Tektronix 1A2 plug-in  
Date: Tue, 4 May 1999 22:35:03 -0700  
MIME-Version: 1.0  
Content-Type: text/plain; charset=ISO-8859-1  
Content-Transfer-Encoding: 7bit

An original or a decent copy is all I ask. Thanks for looking.

Arden Allen KB6NAX Vallejo, CA gumbear@pacbell.net

-----  
From: "David Newkirk" <dpnewkirk@home.com>  
To: Old Tube Radios <boatanchors@theporch.com>  
Subject: RE: Ranger POT needed  
Date: Wed, 5 May 1999 06:35:07 -0400  
Message-ID: <000001be96e2\$f1eeffe0\$11670518@cc328679-a.vron1.nj.home.com>  
MIME-Version: 1.0  
Content-Type: text/plain;  
charset="iso-8859-1"  
Content-Transfer-Encoding: 7bit

Buzz Harrah wrote:

> Anybody know where to get the 4Watt (or bigger) 25K, linear  
> taper, WIREWOUND  
> pot that is used in the drive control on the RANGER? I checked about 9  
> catalogs and only found one in one, but they want \$40 for it (Newark).  
> Everybody else either has the wrong value or the wattage isn't big enough

> (usually they are 2watts max). (Mine seems to have DROPPED to 17K max  
> resistance, which isn't enough.)

As an alternative, a rotary switch with suitable-value fixed resistors between all of its fixed contacts will work--10 resistors [minimum] for an 11-position switch, 11 resistors [minimum] for a 12-position switch, etc. ("Minimum" because you may want to put some resistance between the "top" and/or "bottom" of the control and whatever it connects to.) Of course, for a strictly linear control, to find the value of each resistor you'd divide the desired total resistance by the total number of resistors used, but one of the neat things about this approach is that if you already know that part of the pot's range "isn't used," or that most of the control's useful adjustment span is over a particular subrange of resistances, you can engineer the replacement control to exhibit higher resolution across that span. Use half-watt or bigger resistors and you easily achieve more dissipation capability than the replaced control; you can even put higher-power resistors in the positions where you know the dissipation will be higher.

I've used just such controls in Class C driver- and final-screen applications for nearly 15 years; circuit operation is usually such that the fine resolution of a wirewound control isn't necessary to set a reasonable optimum drive or output value.

73,

Dave Newkirk, W9VES  
dpnewkirk@home.com

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Message-Id: <v03102812b355c477146c@[134.53.65.12]>  
Mime-Version: 1.0  
Content-Type: text/plain; charset="us-ascii"  
Date: Wed, 5 May 1999 06:26:12 -0400  
To: Old Tube Radios <boatanchors@theporch.com>  
From: Jim Garland W8ZR <4CX250B@miavx1.acs.muohio.edu>  
Subject: Re: Insulator Ceramic

>Those white insulators we use in our boatanchors-  
>Are they basically the same material as that we hear about being  
>used in superconducting experiments today?

>Thanks,  
>Dave AB5S

Hi Dave,

Superconducting ceramics, discovered in 1987, bear little relation to the

white ceramics used as high voltage insulators. There are several types of superconducting ceramics, the most common being yttrium-barium-copper oxide (YBCO -- pronounced "ib-coe")), and bismuth-strontium-calcium-copper oxide (BSCCO -- pronounced "biss-coe"). The crystalline structure of these materials is complex, but includes planes of copper and oxygen, alternating in a regular periodic structure.

These materials, known as "high Tc superconductors", "Tc" being the temperature below which they exhibit no electrical resistance, were discovered in a ceramic form, which means that the solid material was made of a jumble of tiny crystallites. They looked like black refrigerator magnets, and were highly porous and brittle. Over the years, the materials chemistry techniques improved, and today high temperature superconductors can be made as perfect crystals, which are generally better suited for scientific experimentation.

High Tc superconductors, even in perfect crystalline form, still remain hard and brittle, however, which has made it difficult to incorporate them into wires for winding magnets or carrying very high currents without loss. Nevertheless, they are extremely interesting from a scientific viewpoint, and hopes still are high of eventual large-scale industrial applications. The 1987 discovery spun off numerous small companies dedicated to special applications of the materials, and some of them are doing well.

To provide historical context, the phenomenon of superconductivity was discovered in 1911 by Kamerlingh-Onnes, who dumped some mercury into a pool of liquid helium and discovered that the mercury lost all of its electrical resistance. (K-O was also the first person to liquify helium, which has a boiling point of 4.2K, or -268.8 degrees centigrade.) Over the years, many other metals were discovered to have this property, and today we know that about two-thirds of metallic elements are superconductors. The noble metals -- gold, silver, copper -- are notable exceptions, as are the alkali metals (potassium, sodium, calcium). Decades of research discovered that various alloys and compounds, such as niobium-tin, and niobium-titanium, also were superconducting, but until 1987 the highest temperature any of them could achieve was about 20K. (-253 degrees C). For this reason they are called "low Tc superconductors." By contrast, the "high Tc" materials keep their superconducting properties up to around 100K (-173 degrees C). This higher temperature is very important because it means that liquid nitrogen can be used as a coolant. Liquid nitrogen only costs about \$0.25 for a liter, whereas liquid helium costs about \$5 for a liter. Thus the economics favoring the high Tc superconductors for industrial applications is extremely attractive. Of course, the BIG breakthrough will come when room temperature superconductors are discovered, and the search for such materials is underway at many laboratories.

Superconductivity is a very complex phenomenon. Although some of the



electrical, magnetic, and thermodynamic properties of superconductors can be explained fairly easily, a well-grounded understanding of superconductivity requires years of study of quantum mechanics and solid state physics. Superconductivity is far more subtle than, say, semiconductor physics, which underlies transistor technology.

73,

Jim Garland W8ZR

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End of BOATANCHORS Digest 2533  
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